

Application No.: 09/837,496

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**AMENDMENTS TO THE CLAIMS**

Please amend the claims as follows:

25. (Previously Presented, Presently Withdrawn) A method for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising the steps of:

processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof;

determining an initial bit rate demand for each current picture according to the associated spatial activity and temporal activity; and

for at least one current picture, determining whether the associated spatial activity is below a lower threshold, and if so, increasing the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.

26. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of:

adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

27. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of:

adjusting said initial bit rate demand for each current picture according to whether a fade is detected for the current picture.

28. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of:

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adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

29. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

30. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of:

for at least one current picture, adjusting the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold.

31. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.

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32. (Previously Presented, Presently Withdrawn) A method in accordance with claim 31, comprising the further step of, for the at least one current picture:

tempering the upwards or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

33. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of: for at least one current picture, adjusting the initial bit rate demand thereof according to whether a horizontal pixel resolution thereof exceeds or is less than a nominal level.

34. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of: for at least one current picture, adjusting the initial bit rate demand thereof upwards when an associated brightness level is less than a lower threshold.

35. (Previously Presented, Presently Withdrawn) A method in accordance with claim 25, comprising the further step of: for at least one current picture, adjusting the initial bit rate demand thereof according to a priority factor thereof which indicates a relative importance of the at least one current picture in the multiplexed data stream.

36. (Previously Presented, Presently Withdrawn) An apparatus for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising:

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means for processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof;

means for determining an initial bit rate demand for each current picture according to the associated spatial activity and temporal activity; and

means for determining, for at least one current picture, whether the associated spatial activity is below a lower threshold, and if so, increasing the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.

37. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

38. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a fade is detected for the current picture.

39. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

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40. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

means for adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

41. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold.

42. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

means for adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.

43. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 42, wherein, for the at least one current picture, the apparatus further comprises:

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means for tempering the upward or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

44. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof according to whether a horizontal pixel resolution thereof exceeds or is less than a nominal level.

45. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting, for at *least* one current picture, the initial bit rate demand thereof upward when an associated brightness level is less than a lower threshold.

46. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 36, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof according to a priority factor thereof which indicates a relative importance of the at least one current picture in the multiplexed data stream.

47. (Previously Presented, Presently Withdrawn) A method for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising the steps of:

processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof;

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determining an initial bit rate demand for each current picture according to the associated spatial activity and temporal activity; and

for at least one current picture, adjusting the initial bit rate demand thereof upwards when an associated brightness level is less than a lower threshold.

48. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

49. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a fade is detected for the current picture.

50. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

51. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of: for at least one current picture, determining whether the associated spatial activity is below a

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lower threshold, and if so, increasing the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.

52. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

53. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of:

for at least one current picture, adjusting the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold.

54. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.



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55. (Previously Presented, Presently Withdrawn) A method in accordance with claim 54, comprising the further step of, for the at least one current picture:  
tempering the upwards or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

56. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising  
the further step of:  
for at least one current picture, adjusting the initial bit rate demand thereof according to whether a horizontal pixel resolution thereof exceeds or is less than a nominal level.

57. (Previously Presented, Presently Withdrawn) A method in accordance with claim 47, comprising the further step of:  
for at least one current picture, adjusting the initial bit rate demand thereof according to a priority factor thereof which indicates a relative importance of the at least one current picture in the multiplexed data stream.

58. (Previously Presented, Presently Withdrawn) An apparatus for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising:  
means for processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof;  
means for determining an initial bit rate demand for each current picture according to the associated spatial activity and temporal activity; and

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means for adjusting, for at least one current picture, the initial hit rate demand thereof upward when an associated brightness level is less than a lower threshold.

59. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

60. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 59, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a fade is detected for the current picture.

61. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

62. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for determining, for at least one current picture, whether the associated spatial activity is below a lower threshold, and if so, *increasing* the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.

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63. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 59, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

means for adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

64. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold.

65. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

means for adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.

66. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 65, wherein, for the at least one current picture, the apparatus further comprises:

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means for tempering the upward or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

67. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for adjusting, for at least one current picture, the initial hit rate demand thereof according to whether a horizontal pixel resolution thereof exceeds or is less than a nominal level.

68. (Previously Presented, Presently Withdrawn) Apparatus in accordance with claim 58, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof according to a priority factor thereof which indicates a relative importance of the *at least* one current picture in the multiplexed data stream.

69. (Allowed) A method for determining a bit rate need of a plurality of variable rate video channels in a video encoder, comprising the steps of:

processing video data from a current picture in each respective channel to determine at least a spatial activity and a temporal activity thereof;

determining a bit rate demand for each current picture according to the associated spatial activity and temporal activity;

determining whether characteristics of the current pictures exist for adjusting the initial bit rate demand thereof, and if so, adjusting the initial bit rate demand,

determining an overall available bit rate for transmitting the current pictures in a multiplexed data stream;

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determining, in an initial iteration, an initial allocated bit rate for each current picture according to a ratio of bit rate demand thereof to a sum of the bit rate demands from each current picture; determining a bit rate surplus or deficit between the overall available bit rate and a sum of the initial allocated bit rates; and adjusting, in at least one successive iteration, the initial allocated bit rate for at least some of the current pictures according to the surplus or deficit, and a ratio of bit rate demand thereof to a sum of the bit rate demands thereof.

70. (Allowed) A method in accordance with claim 69, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

71. (Allowed) A method in accordance with claim 69, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a fade is detected for the current picture.

72. (Allowed) A method in accordance with claim 69, comprising the further step of: adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

73. (Allowed) A method in accordance with claim 69, comprising the further step of: for at least one current picture, determining whether the associated spatial activity is below a lower threshold, and if so, increasing the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.

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74. (Allowed) A method in accordance with claim 69, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

75. (Allowed) A method in accordance with claim 69, comprising the further step of:

for at least one current picture, adjusting the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold,

76. (Allowed) A method in accordance with claim 69, comprising at least one of the further steps of, for at least one current picture:

adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.

77. (Allowed) A method in accordance with claim 76, comprising the further step of, for the at least one current picture:

tempering the upwards or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

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78. (Allowed) A method in accordance with claim 69, comprising the further step of:  
for at least one current picture, adjusting the initial bit rate demand thereof according to whether  
a horizontal pixel resolution thereof exceeds or is less than a nominal level.

79. (Allowed) A method in accordance with claim 69, comprising the further step of:  
for at least one current picture, adjusting the initial bit rate demand thereof upwards when an  
associated brightness level is less than a lower threshold.

80. (Allowed) A method in accordance with claim 69, comprising the further step of:  
for at least one current picture, adjusting the initial bit rate demand thereof according to a  
priority factor thereof which indicates a relative importance of the  
at least one current picture in the multiplexed data stream.

81. (Previously Allowed, Presently Amended) An apparatus for determining a bit rate need of a  
plurality of variable rate video channels in a video encoder, comprising:  
means for processing video data from a current picture in each respective channel to determine  
at least a spatial activity *and* a temporal activity thereof;  
means for determining a bit rate demand for each current picture according to the associated  
spatial activity and temporal activity;  
means for determining whether characteristics of the current pictures exist for adjusting the  
initial bit rate demand thereof, and if so, adjusting the initial bit rate; means for determining an  
overall available bit rate for transmitting the current pictures in a multiplexed data stream;  
means for determining, in an initial iteration, an initial allocated bit rate for each current picture

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according to a ratio of bit rate demand thereof to a sum of the bit rate demands from each current picture;

means for determining a hit rate surplus or deficit between the overall available bit rate and a sum of the initial allocated bit rates; and

means for adjusting, in at least one successive iteration, the initial allocated bit rate for at least some of the current pictures according to the surplus or deficit, and a ratio of bit rate demand thereof to a sum of the bit rate demands thereof.

82. (Allowed) The apparatus of claim 81, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a scene change is detected for the current picture.

83. (Allowed) The apparatus of claim 81, further comprising:

means for adjusting said initial hit rate demand for each current picture according to whether a fade is detected for the current picture.

84. (Allowed) The apparatus of claim 81, further comprising:

means for adjusting said initial bit rate demand for each current picture according to whether a flash is detected for the current picture.

85. (Allowed) The apparatus of claim 61, further comprising:

means for determining, for at least one current picture, whether the associated spatial activity is below a lower threshold, and if so, increasing the associated temporal activity thereof, and adjusting the initial bit rate demand thereof according to the increased temporal activity thereof.



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86. (Allowed) The apparatus of claim 81, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof upwards when the associated temporal activity exceeds an upper threshold; and

means for adjusting the initial bit rate demand thereof downwards when the associated temporal activity is less than a lower threshold.

87. (Allowed) The apparatus of claim 81, further comprising:

means for adjusting, for at least one current picture, the initial bit rate demand thereof upwards when a quantization level of at least one previous picture associated therewith of a same picture type exceeds an upper threshold.

88. (Allowed) The apparatus of claim 81, wherein, for at least one current picture, the apparatus further comprises:

means for adjusting the initial bit rate demand thereof downwards when a length of an associated group of pictures exceeds a nominal level; and

means for adjusting the initial bit rate demand thereof upwards when a length of an associated group of pictures is less than a nominal level.

89. (Allowed) The apparatus of claim 88, wherein, for the at least one current picture, the apparatus further comprises:

means for tempering the upward or downward adjusting of the initial bit rate demand thereof when the temporal activity thereof exceeds an upper threshold.

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90. (Allowed) The apparatus of claim 81, further comprising:  
means for adjusting, for at least one current picture, the initial bit rate demand thereof according to whether a horizontal pixel resolution thereof exceeds or is less than a nominal level.

91. (Allowed) The apparatus of claim 81, further comprising:  
means for adjusting, for at least one current picture, the initial bit rate demand thereof upward when an associated brightness level is less than a lower threshold.

92. (Allowed) The apparatus of claim 81, further comprising:  
means for adjusting, for at least one current picture, the initial bit rate demand thereof according to a priority factor thereof which indicates a relative importance of the at least one current picture in the multiplexed data stream.